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ABSTRACT

Media adjunct programing (MAP) techniques for presenting individualized, self-paced instruction were compared to traditional instructor-classroom (TIC) techniques in an undergraduate pilot Weather course. The MAP group completed the course in significantly less time than did the TIC group, representing a 29 percent time savings. In addition, MAP students performed equally as well as TIC students on the posttest and retention test, had significantly lower state anxiety scores while learning the materials, and reported significantly higher attitude scores toward the instructional method they received. Predictions of an inverse relationship between state curiosity and state-anxiety were only partially supported, in that significant interactions were found between treatment conditions and flight groups. (PB)

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MEDIA ADJUNCT PROGRAMMING

AN INDIVIDUALIZED MEDIA-MANAGED APPROACH TO ACADEMIC PILOT TRAINING

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Media adjunct programming (MAP) techniques for presenting individualized, self-paced instruction were compared to traditional instructor-classroom (TIC) techniques in an undergraduate pilot Weather course. The MAP group completed the course in significantly less time than the TIC group, representing a 29% time savings. In addition, MAP students performed equally as well on the posttest and retention test, had significantly lower state anxiety scores while learning the materials and reported significantly higher attitude scores toward the instructional method than TIC students. Predictions on the inverse relationship between state curiosity and state anxiety were partially supported, in that significant interactions were found between treatment conditions and flight groups. Possible factors contributing to flight group differences were discussed.

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PREFACE

This study was conducted under Project 1123, USAF Flying Training Development Task 112302, Instructional Innovations in USAF Flying Training.

The research was carried out under the provisions of Contract F41609-72-C-0015 by McDonnell Douglas Astronautics Co, Eastern Division, St Louis, Missouri. Contract monitor was Captain Gary B. Reid.

MEDIA ADJUNCT PROGRAMMING

AN INDIVIDUALIZED MEDIA-MANAGED APPROACH TO ACADEMIC PILOT TRAINING

INTRODUCTION

The present study sought to apply the principles of educational technology to a representative undergraduate pilot training (UPT) academic course and utilize a variety of multi-media hardware, in an effort to reduce academic training time while improving motivation and retention for students differing in levels of trait curiosity, trait anxiety, and prior knowledge of course content.

APPROACH

The effectiveness of the multi-media approach to instruction is predicated on the assumption that well-planned and tested combinations of media teach more effectively than a single medium due to differential characteristics of the media, learning task, and learner. Combining the multi-media approach, which is primarily concerned with student motivation, with the concept of individualized instruction, which adapts the pace of instruction to student's ability, should increase student motivation and retention of learning while reducing training time.

An individual difference variable of importance for optimal learning is the student's internal motivation (demonstrated by his level of curiosity) toward the learning task. Evidence from a variety of sources suggests that curiosity behaviors enhance the

processing of new information (e.g., Berlyne, 1960, 1967, 1971; Charlesworth, 1969; Day 1967, 1969). Another individual difference variable, anxiety, has been identified as important because it is detrimental to both the arousal of curiosity behaviors and optimal performance within a learning task. For these reasons, well-structured instructional programs which stimulate curiosity and reduce the adverse affects of anxiety should facilitate student performance on the learning task. To fully assess the effects of instructional treatments in this study, it was deemed desirable to take both trait and state curiosity and trait and state anxiety measures.

An instructional treatment which has been identified as an efficient and effective self-instructional technique is adjunct programming (Pressey, 1967; Rothkopf, 1966, 1968; Frase, 1967). This technique generally refers to the utilization of printed instructional materials in conjunction with an accessory program which questions the student over the material, gives him practice in identifying and memorizing important information and provides a means of identifying areas of student difficulty which require remediation or additional study.

In order to fully exploit the potential of adjunct programming within UPT, the present study sought to combine the efficiency of adjunct questions with the versatility of multi-media presentations. This combined concept was entitled Media Adjunct Programming (MAP), which also was extended to include the concept of self-paced individualized instructional management via the adjunct media software and hardware.

METHOD

Adjunct questions over the course units were presented via a modified random access projector which provided a record of student performance and readiness for the next instructional unit. Instructional software in the form of MAP guides provided the student with the course outline, placement of adjunct questions within the course,

and routed him to the various media devices for presenting each course module.

The UPT academic course covering the basic principles of weather was chosen as representative subject matter for applying the MAP approach. Existing course instructional materials and test items were modified as required for presentation on two tape/slide media devices and a motion picture media device. Principles of educational technology were applied to course development and media selection.

The experimental design was basically a pretest-posttest type design in which UPT students were randomly assigned to the MAP or traditional instructor-classroom (TIC) groups on the basis of their entering knowledge of course training objectives, their trait anxiety, and their trait curiosity.

RESULTS

The hypothesis that students in the MAP group would complete the course in less time and perform equally as well on posttest and retention tests as students in the TIC group, was confirmed. Students in the MAP group were found to complete the weather course in 29 percent less time than students in the TIC group. In addition, the differences in performance of the MAP and TIC groups in the posttest and retention tests were not significant. The performance of students in both groups decreased from posttest to retention tests. MAP and TIC groups were comparable in overall levels of state curiosity (or interest) in the weather materials; however, students in the MAP group reported lower levels of state anxiety while learning than students in the TIC groups. Predictions of an inverse relationship between state curiosity and state anxiety were only partially supported in that significant interactions were found between treatment conditions and subject groups. It was found also that students in the MAP group had significantly higher attitudes toward the instructional method. Additionally,

the attitudes of the two ATC weather course instructors toward the MAP method of instruction were generally positive.

CONCLUSIONS

The present study supported the major hypothesis of reduced training time and comparable performance on the posttest and retention test for students in the MAP condition relative to the TIC condition. The advantages of the multi-media, individualized training are suggested by the findings of lower state anxiety and higher attitude scores for MAP than TIC students. The positive attitudes of both UPT students and instructors toward the MAP method indicate the feasibility of this approach for enhancing academic UPT. It should be noted, however, that the efficiency of the MAP approach is manifest in terms of time. A student who finishes "early" has not benefited unless he is permitted to continue this accelerated pace. This study indicates that the individualized approach to all of the UPT academics is feasible and would exploit fully the advantages demonstrated by this research.